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1. INTRODUCTION

Duvha power station has a shortage of office space for Heavy Maintenance Department (HMD) Auxiliary sections, Transport department and Classrooms for training department. There are existing park homes that are currently located in different areas in the station. Three of these park homes are placed next to the old simulator building, two are placed between HMD workshop and coal staith 2 and Two are placed between cooling tower 2 &3. One of the park homes between cooling tower 2&3 shall be moved and transported to Transport department after demolition of the existing transport department park home. Each park home consists of 6 partitioned bedrooms of (3.4 m x 3.1m floor plan/bedroom), 3 of bathrooms for ablution and an open area kitchen. These bedrooms are intended to be used as offices to accommodate Eskom employees from the aforementioned departments at Duvha power station. The buildings are required to modify to suit the need for offices and classrooms.

Duvha power station is currently not complying with the Occupational Health and Safety (OHS) Act and Regulations. Facilities regulations states that every employer shall maintain all rooms and facilities which are prescribed or provided for, in terms of the provisions of these regulations, in clean, hygiene, safe, whole and leak-free condition, and in a good state of repair. The scope herein is for the erection of the new offices and classrooms with sanitation, electrical and Heat Ventilation and Air-conditioning services to ensure the offices comply with the OHS Act and Regulations.

2. SUPPORTING CLAUSES

2.1 SCOPE

This document covers the technical specification for the scope of works detailed herein. The scope covers transportation, supply and installation of park homes for offices and classrooms in Duvha Power Station. The scope of work to be delivered by the Contractor is defined in this document.

2.1.1 Purpose

The purpose of this document is to describe in detail the scope of transport, supply positioning, erecting and installation of the pre-fabricated buildings with all services prescribed herein to be delivered by an appointed contractor.

2.1.2 Applicability

This document applies to Duvha Power Station only.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

2.2.1 Normative

- [1] ISO 9001 Quality Management Systems.
- [2] ENVP0005 - Duvha Power Station Waste Management procedure
- [3] 240-107981296, Constructability Assessment Guideline
- [4] 240-53114186, Project/ Plant Specific Technical Document and Records Management Procedure

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- [5] 240-86973501, Engineering Drawing Standard
- [6] National Environmental Management Act, 1998 (Act 107 of 1998)
- [7] National Environmental Management Waste Act, 2008 (Act 59 of 2008)
- [8] SANS 2001, Construction Works (All applicable parts)
- [9] 32-727 - Eskom Safety, Health, Environment and Quality (SHEQ) Policy
- [10] Occupational Health and Safety Act No. 85 of 1993.

These documents are indispensable for the application of this document, i.e. documents to be used together with this document.

2.2.2 Informative

- [11] 474-58 (Rev1): Document and Records Management
- [12] 240-53113685, Design Review Procedure
- [13] 240-53113953, Manage Engineering Accountability Procedure
- [14] 240-53114002, Engineering Change Management Procedure
- [15] 240-53114026, Project Engineering Change Management Procedure
- [16] 240-56364545, Structural Design and Engineering Standard
- [17] 240-76992014, Project/Plant Specific Technical Documents and Records Management Work Instruction
- [18] 240-55714363 Coal fired power stations lighting and small power installation standard.
- [19] 240-56227443 Generation requirements for control and power cables for power stations standard
- [20] SANS10142-1 The wiring of premises Low voltage installations.
- [21] 240-75850027: Design Guideline for HVAC in the Eskom Coal Fired Power Stations
- [22] 240-102547991: General Technical Specification for HVAC Systems

2.3 DEFINITIONS

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
CoC	Certificate of Compliance

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Abbreviation	Description
ECSA	Engineering Council of South Africa
HMD	Heavy Maintenance Department
ISO	International Organisation of Standards
mm	Millimetre
OHS	Occupational Health and Safety
SANS	South African National Standards
SHEQ	Safety, Health, Environmental & Quality
SE	System Engineer
PEM	Penn Engineering
PM	Project Manager
PSR	Plant Safety Regulations
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
TDS	Technical Data Sheet

2.5 ROLES AND RESPONSIBILITIES

Project manager/ Maintenance Supervisor

To ensure that the Contractor execute all the work specified in the scope of work on the set timelines and ensure that:

- All workers have appropriate PPE
- All workers are familiar with the risk assessment, safety precautions and hazards
- The work is carried out by appropriately by competent person(s)
- Ensure that all documents are accurately completed and signed before returning the documents like service instruction and information documentation to Work Management Department for capturing and filing.

System Engineer (SE)

- As custodian of the Maintenance Basis, they must ensure all actions required in terms of the reliability base and any other reliability matters are implemented on their systems
- The SE will review all works, which is being executed, and ensure that quality assurance is adhered to.
- Must inspect the system after the contractor has completed the tasks, following the approved quality control plan.

Appointed Contractor

- All contractors shall work within the parameter of the job description and scope of work. To keep all instructions/ procedures on hand and supply Eskom power station with reference to be included in this document and supply record and history requirements.
- Contractors must also ensure that the work is performed to the highest standard and safety standards and regulations.

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- The Contractor is responsible for executing the works as detailed in this document. The Contractor takes all necessary precautions that may be required to safeguard existing infrastructure and services including protection of all surface works. These additional works are formally documented in method statements for the Employer's review and acceptance.
- The Contractor takes note that review and acceptance of any document/ drawing/ design calculations by the Project Manager in no way relieves the Contractor of his liability for the works. The Contractor remains liable for all works conducted as per this document.
- The Contractor is liable and fully accountable for the works and the constructability thereof.
- The Contractor interacts with others through the Project Manager, to ensure seamless integration of the various works.
- Execute the scope of work as per the employer's specification.
- Must ensure quality assurance is done as per QM 58 and adhered to SHEQ Policy.

2.6 REQUIRED CRITERIA FOR CONSULTANT

Not Applicable

2.7 RELATED/SUPPORTING DOCUMENTS

Not Applicable

3. SCOPE OF WORKS

3.1 DESCRIPTION OF THE WORKS

The Contractor is responsible for transporting, positioning, installation of services (water supply, drainage, electrical supply, internet connections, and Air-conditioning system) and modifying the current partitions works as detailed in this document and office layouts attached. The Contractor shall take all necessary precautions that may be required to safeguard existing infrastructure and services (underground and surface) including protection of all surface works. The contractor is responsible to verify all underground service by scanning surveys prior any excavation works. These additional works are formally documented as part of method statements for the Employer's review and acceptance.

The Contractor takes note that review and acceptance of any document/ drawing/ design calculations by the Project Manager in no way relieves the Contractor of his liability for the works. The Contractor remains liable for all works conducted as per this document.

The Contractor is liable and fully accountable for the works and the constructability thereof.

The Contractor interacts with others through the Project Manager, to ensure seamless integration of the various works.

Only trained personnel are allowed to perform repair and replacement works of all infrastructure.

Records of training are maintained by the Contractor's Quality Control Department

3.2 EMPLOYER'S DESIGN REQUIREMENTS

The design of the park home has been carried out by the Original Manufacture of the park homes. The buildings are supplied as one complete unit to the client. These building exist already however there is a need to modify the internal partitioning walls, install and re-arrange services inside the buildings as per the scope of work defined in section 4 below.

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3.3 CONSULTANT 'S DESIGN

3.3.1 Temporary Works

The *Contractor* is responsible for the design of all temporary works required for the execution of the *works* and is mandated in terms of Construction Regulations 2014: Duties of Designer, 6(2) a – d, to fulfil the duties described therein for the temporary works designs done by the *Contractor*.

The *Contractor's* appointed ECSA professionally registered engineer:

- i. Reviews and approves (by signature) the designs and drawings of all temporary works and additional supports and method statements produced by the *Contractor*; and
- ii. Supervises, inspects and approves the *works* as per such.

All temporary works designs, where existing infrastructure are impacted by the *works*, are submitted to the *Project Manager* for review and acceptance, to prove that the existing infrastructure can withstand the induced load or proposed temporary works. The *Contractor* therefore submits all design calculations, in a design report which includes, but is not limited to, all inspection reports, survey data, design analysis models, assumptions, drawings/sketches, rigging studies etc.

4. CONSTRUCTION

The *Contractor* is responsible for the construction of the *works*, including all temporary works and design thereof, and all associated services in accordance with the detailed drawings and specifications.

The *Contractor* disposes of all demolished waste at a designated waste disposal bins on site as indicated by the *Project Manager*. The waste disposal site is selected to suit the classification of the materials to be disposed of. All hazardous waste such as asbestos shall be disposed at Licenced disposal waste sites and certificates of disposal are required to be submitted to the *Employer*.

4.1 CIVIL AND STRUCTURES SCOPE

4.1.1 Preparations and site clearance

- Remove all dirt weeds and any other obstructions in the area and correctly dispose in to the skips.
- The project manager is responsible for provide waste bins/skips for disposal of any rubble or waste however the contractor shall indicate the reasonable amount of waste bins required.

4.1.2 Positioning of the building

- Survey the areas to determine correct levels of placing the buildings.
- Ground slope shall not exceed a ratio 100mm: length of the buildings.
- Supply and install adjustable mechanical jacks similar to the existing on site to be positioned not more than 2.5m between the lengths of the building for placement of the buildings.
- Jacks shall be placed on top of precast concrete blocks to create a stable footing
- Buildings shall be positioned in accordance to the attached layouts

4.1.3 Demolition works

- The personnel occupying the building shall evacuate and remove all valuable items prior demolition of the buildings.
- Inspection shall be conducted between the client or client's representative and the contractor to identify material and equipment that are still in good condition to be re-used in future.
- Items that are still in good condition shall be remove first and stored in a designated location as instructed by the Project Manager.

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- All electrical supplies shall be isolated from the main power supply as per the plant safety regulations (PSR) for transport department.
- The electrical components that will not be re-used should be disposed as per Duvha Power Station Waste Management procedure (ENVP0005). These components includes power cables, wall socket, distribution boards and lights
- Water supply shall be isolated from the main source as indicated by the Engineer
- Sewer services towards the discharge points shall be blanked off as Instructed by the relevant Engineer.
- All waste services and drains such as sewer shall be flushed off before disconnecting.
- All open ends of services such as electrical main supply, water supply and sewer lines shall be closed and protected from being damaged.
- All IT cables shall be removed from the buildings prior demolition
- Carefully remove all the air-conditioning system from the buildings.
- Removal of the split air-cons shall be done by a qualified refrigeration technician
- Refrigeration Technician proof of trade shall be provided.
- The old air-cons shall be taken to Stores to a redundant yard
- The area shall have a solid barricade prior any demolition work starts.
- Remove furniture and electrical appliances from the building before demolition starts.
- All Station assets items shall be taken to Duvha storage area as instructed by the Project Manger
- Fully demolish the existing park home and prepare the area for the new park home to be placed in.
- The contractor shall provide dust and ground pollution prevention and mitigation plan to the project manager for review and approval.
- Partly demolish the existing internal walls on the new park homes for the preparation of rearrangement of the offices and classrooms

4.1.4 Partitioning Wall

All portioning walls shall be in accordance with the layout drawings attached.

- Supply and install a non-bearing dry wall of plasterboards of level 6 with timber studs wall framing partitioned as per attached layouts.
- Partition walls shall include all accessories such as trimming between the walls and the floor tiles, mounting brackets, corner connectors and skirting.
- Standard grade plaster board must be manufactured in accordance with the latest edition of SANS 266:2003 consisting of aerated gypsum core bonded to durable paper liners with unprinted liner.
- Fire Retarded Plaster board manufactured in accordance with the latest edition of SANS 266:2003 Edition 2.2 consisting of aerated gypsum core with suitable additions fibreglass stands and un-exfoliated vermiculite bonded to durable paper liners with unprinted liner.
- Moisture Resistant Plasterboard – Standard Plaster board manufactured in accordance with the latest edition of SANS 266:2003 Edition 2.2 consisting of aerated gypsum with special additive core bonded to durable impregnated green paper liners with unprinted liner.
- The timber studs to be 70mm x 50mm sets with the greater dimension perpendicular to the wall.
- All vertical studs shall be spaced at centres of 500mm.
- All horizontal studs shall be spaced at centres of not more than 1000mm.
- Maximum distance between fixings shall be 300mm
- The Drywall Partitions and lightweight internal walls shall be installed in strict adherence to the material manufacturers' recommendations.
- All Requirements and tolerances shall be referred to Table 1 and 2 of SANS 266

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- Partitioning walls shall be sealed with the existing ceiling with silicon passed product accordance with manufacturer's instructions.
- Walls and Ceiling walls shall be painted with gloss enamel (colour preferred colour to be provided by the client) to comply with SANS 10305: part 1 to 4
- Reinforcement of open plan and boardroom roof structure shall be made in order to support the ceiling.

4.1.5 Plumbing

4.1.5.1 Portable water supply

- Supply and install class 16 high density polyethylene pipes for the supply of portable water from the nearest water source (fire hydrant) to the buildings.
- The contractor is responsible for the supply of all consumables, fittings and connection accessories required.
- Supply and install 15mm nominal diameter stainless steel flexible water supply pipes with isolating valves for each pipe to be connected from the building main wall to basins, toilets and kitchen sinks for cold and hot water.
- Supply and install PEM twist and lock range of fittings or equivalent
- Pipe size shall be of 15mm nominal diameter installed from the water source to the building laid underground with a minimum soil cover of 200mm.
- The excavated soil shall be reused for backfilling after laying the pipe.
- Isolation valves shall be installed after the tap-off point from the main water supply course.
- Plumbing system pressure tested to 10 bar
- Pipes shall be certified in accordance to SANS 15875

4.1.5.2 Drainage pipes

- Excavate to lay new drainage pipes; the contractor shall make provision for breaking of reinforced concrete slab of +/- 150mm thickness for HMD offices. The concrete slab shall be repaired after laying the drainpipe.
- Scan the ground to detect present underground services before excavation work can start.
- Supply and install 110mm nominal diameter of white PVC or equivalent pipes for black water. Pipes to be installed from the buildings to the nearest main sewer manhole with a constant grade of 2% slope.
- Excavation of drainpipes shall have a minimum soil cover of 300mm for backfilling where possible.
- Excavated material shall be used for backfilling in layers not exceeding 150mm thickness.
- Modify the existing sewer manholes on the side walls to connect the new sewer drain pipes, the manholes shall be sealed with concrete grouting around the pipe in the points of connection.
- Supply and install connection fittings and accessories for drainage pipes.
- Supply and install 50mm nominal diameter of white PVC or equivalent pipes for grey water. The pipes to be connected from the sinks, hand wash basins and urinary system to the main 110 nominal diameter pipes by means of connection fittings and accessories.
- 45° bends shall be used on all vertical and horizontal for joints when joining pipes into the main building main drain line.
- 90° bends shall be installed for toilets, basins and kitchen sinks.
- Accessories to include cleaning and inspection eye on pipe bends
- Dished Gullies
- S-type water traps for basins and kitchen sinks
- 45° plain junctions for connections

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4.1.5.3 Replacement of Geysers (hot water heaters)

- 150 L Franke/Kwikot combi slim electric geysers or similar specification;
- Supply of geysers shall include all connecting and installation accessories and fittings.
- Each geyser shall have Pressure safety valve, drain pipes and geyser tray
- Certified in accordance with IPX4 International standards;
- ISO 9001 and SABS SANS 151 Approved;

4.1.5.4 Supply of Toilet suite

Supply, install and connect;

- Ceramic close couple cistern or equivalent;
- Cistern - SABS Certified Mark No: 1182/2512 SANS 821
- Capacity 9 litres with left or right side inlet flush handle;
- Afsan low level pan or equivalent;
- Toilet seat - B2 seat and cover

4.1.5.5 Replacement of Basins

- White porcelain, Amber wash hand basin with pedestal;
- Install new kitchen double sink basins.

4.1.6 Replacement of Taps

- Cobra mixers taps;
- In accordance with SANS 226 Type 2;

4.1.7 Carpentry

4.1.7.1 Installation of Kitchen cupboards

- Supply and install new built in cupboards to comply with the requirement of SANS 1385
- Material shall be laminated wood with scratch resistance
- Cup boards shall have double doors cabins for plates and cups as well as 4 shelves
- Cupboards layout shall make provision of single leaf door fridge.
- The Cupboards type shall be combination unit cupboards;
- Painting shall comply with section 3.2.6 of SANS 1385
- Fittings, handles, fasteners, catches, clips, and washers shall comply with section 3.2.10 of SANS 1385
- Cupboards edges shall be of type 6: PVC edge strips
- The contractor shall submit product catalogue to the client to select preferred colours and textures.

4.1.7.2 Replacement of Doors

External & Internal

- 40mm thick door panel cut from standard Kwik space PU wall panel;
- Standard size of 2032mm x 813mm;
- Each door framed with 0.5mm pre-painted galvanised capping riveted to door panel;
- Natural anodised aluminium rebated door frame including rubber buffers and heavy duty aluminium hinges;
- Pre-painted galvanised drip rail to doors opening outwards;
- External locks are five lever locks complete with stainless steel striker plate and two keys; Chrome plated handles or Equivalent;
- Installation of trellidor security burglar doors or similar product in all external doors.

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4.1.7.3 Flooring

Offices, Boardrooms & Reception area

- Supply and install laminated Kaindl-Stone Grey or similar wood flooring including connection and finishing profiles and other accessories required in accordance with SANS 2001 CT1.
- Supply and install premia skirting 15 x 80 mm Columbia.
- Authentic Oak Ash White or similar colour.
- The floor shall be cleaned and prepared for the installation of the laminated wood flooring.
- The contractor shall submit product catalogue to the client to select preferred colours and texture of the floor.

Kitchen and Toilets

- Supply and install water and dirt resistant vinyl coated tiles in the kitchen and toilet flooring including connection and finishing profiles and other accessories required in accordance with SANS 2001 CT1.
- Supply and install premia skirting 15 x 80 mm Columbia.
- Reclaimed Oak Brown colour or similar.
- The floor shall be cleaned and prepared for the installation of the vinyl.
- The contractor shall submit product catalogue to the client to select preferred colours and texture of the floor.

4.1.8 Fittings

Replacement of blinds

- Supply and install blinds type B, to comply with SANS 947
- Blinds for windows must be royal blue in colour in accordance with SANS 1091.
- Vertical type of blinds are preferred

Mirrors

- 3mm silvered float copper backed glass with exposed chromium plated corner brackets fixed to panels; standard sizes - 300 x 300mm high

4.1.9 Walkways

- Remove 150mm top soil for the walkway from the offices to the existing paved area
- Walkway path is shown on the building proposed layouts
- Import material, lay and compact on the walkway.
- Compaction shall reach 95% of Mod Aashto
- Supply and install interlocking paving bricks, type S-A blocks of 80mm thick size.
- The walkway shall be locked on the edges with vertical straight concrete kerbing for paving blocks to prevent looseness.
- The Walkway shall be elevated from the ground of about 100mm to prevent flooding during rainy seasons
- Walkways shall have a minimum of 1.2 width.

4.1.10 Shade Canopy for doors

Main entrance

- Supply and install 76mm OD with 8mm thick galvanised circular hollowed section columns of 3m long
- Supply and install 70x70x6mm angle galvanised equal leg angle irons of 2,5m long beams

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- Supply and install 60x60x4mm angle galvanised equal leg angle irons of 2,5m long beams
- Supply and install Galvanised IBR sheeting of 762x0.8mm with consumables.
- All structural connections to be welds all around fillet welds of 5mm
- Excavate and cast 25MPa with 19mm stones concrete for foundation footings.
- Columns to be cast in concrete
- Column foundations to be (400x 400x 500mm)

Welding requirements

- NDTs shall be conducted as per 240-83539994 - Standard for Non-Destructive Testing (NDT) on Eskom Plant
- Welding shall be conducted as per 240-106628253 Standard for Welding Requirements on Eskom Plant

Awning shade

- Supply and install new multiwall awning of 1500mm x 1000mm on all emergency exit doors

4.1.11 Staircases for external doors

- Provide precast concrete blocks to be placed underneath the existing steel staircases.
- Refurbish the exiting staircases as follows;
 - Prepare and sandblast the steel structures
 - Apply corrosion protection as per specification CPS 01 stipulated in the Eskom Standard 240-106365693 - Standard for External Corrosion Protection of Plant Equipment and Associated Piping with Coatings.
 - The contractor shall ensure that the corrosion protection standard mentioned here in is adhered to, it is the contractor's responsibility that they study and understand the standard. All clarification required shall be done prior to execution of the works.
- Each staircase have the following components or members;
 - 4 columns of 40x40x3 angle iron mild steel of 800mm long each
 - 6 footing of 100x100x3 flat bar mild steel
 - 4 beams of 40x40x3 angle iron mild steel of 1200mm long each
 - 1 vastrap plat plates of 1200x1200x3 as platform
 - 2 diagonal beams supporting steps 40x40x3 angle iron mild steel of 1300mm long each
 - 4 vertical hollow section of 25x25x3 with a length of 1000mm long each
 - 4 horizontal hollow section of 25x25x3 with a length of 1200mm long each
 - 2 Diagonal hand railing hollow section of 25x25x3 with a length of 1300mm long each
 - 4 vastrap plates of 1200x250x3 for steps with welded flat bars of 230x20x3 on both sides of the plates. The vastrap shall be bended on both sides as shown in the drawing to avoid sharp edges.

4.2 HVAC SCOPE OF WORK (SPLIT AIR-CONDITIONING UNITS)

- Installation of the unit to be done in accordance with OEM requirements. The indoor units shall be installed by using secure and adequate supports. Allow adequate drop for condensate drainage.
- The indoor unit position shall be verified on site by the project manager and the *Contractor*.
- The outdoor unit shall be installed level and securely on galvanised / powder coated brackets against the wall. Brackets shall be 800mm to 1000mm above floor level. Outdoor unit can also be installed level and securely on concrete slabs or brackets. Brackets or slabs to be supplied by *Contractor*. Position shall be verified on site by the project manager and the *Contractor*.
- Pipe work inside the building shall be inserted neatly inside white PVC trunking. Trunking shall be fixed to the wall with screws – not double-sided tape.
- Pipe work outside the building shall be inserted neatly inside grey 75 x 75 mm PVC trunking. Trunking shall be fixed to the wall with screws – not double-sided tape.

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- Trunking shall be very neat especially at ends, corners and joints. Trunking shall always be horizontal and vertical level.
- Condensate drain shall lead to the building drain via 20 mm white PVC conduit and saddled. Spacing between saddles shall not exceed 500 mm. Flexible conduit may be used.
- All excess gaps drilled into the offices shall be properly sealed by the contractor. Use of expansion foam is acceptable, however it must be neat.
- The drain pipe slope shall be adequate for condensate drainage. The integrity of the drains must be checked and proven to Eskom.
- Only new refrigerant grade copper tubing fittings shall be used. The use of aluminium tubes is not allowed
- Copper pipes may not be damaged or kinked in any way.
- All refrigerant copper tubing shall be insulated separately with amerflex, all the way between the indoor and outdoor units.
- The refrigeration system shall be leak-free – Pressure testing to be conducted in line with OEM installation requirements
- Pressure test with dry nitrogen shall be witnessed by the client.
- The refrigerant system shall be properly evacuated in line with OEM specifications. Vacuum test to be witnessed by the client.
- The correct charge of suitable refrigerant shall be charged – to be witnessed by the client.
- Only qualified refrigeration technicians shall do the installation – proof of Safe Handling of Refrigerants competency must be provided.
 - I. Refrigeration CoC (certificate of compliance) shall be issued for every installation.
- Comprehensive commissioning report shall be handed over to the project manager.
- The Operator manuals and remote controls shall be handed over to the project manager.
- The workmanship shall carry a 1 year unlimited warranty.
- Basic training on air condition operations, i.e. Remote control

Notes:

- Where new split unit is installed to replace an old window unit the following shall apply:
 - I. The complete old air conditioner unit shall be removed – indoor and outdoor units without any damage caused to old equipment and handed over to the project manager.
 - II. None of the old copper pipes, wires, brackets or trunkings may be re-used if applicable.
 - III. Repair the area where the old unit was removed by using similar material of construction used on that same building. Plug excess holes, etc.
 - IV. All the old equipment remains the property of Duvha Power Station and need to be handed over.
 - V. See Annexure: A1 for air conditioning units specifications

4.2.1 Refrigerant piping system

The refrigerant piping system is to have the following minimum requirements:

- The necessary traps to be installed in the refrigerant lines to ensure oil return for applications where the outdoor unit is installed higher than indoor unit.
- Flare connections to be used at the indoor and outdoor unit.
- Three-way valves with service port are to be installed at the outdoor unit for connection of standard refrigerant pressure gauges.
- Fit a filter in the liquid line with a sight glass and moisture indication thereafter.
- Provide facilities for charging the units with refrigerant and measuring the refrigerant pressures of the unit using standard refrigerant gauges.

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- Units which are not pre-charged are to be evacuated to a vacuum of not less than 4mm Hg before charging.
- The insulation for the refrigerant piping to be of the “ultra-violet resistant” type. Insulation exposed to outside weather to be finished off with ultra-violet resistant plastic tape or paint.
- Contractor to issue refrigeration CoC after the completion of the works

4.2.1.1 Condensate Drainage

Drainage of condensate from the units to be collected by the following means:

- A pan of sufficient size to catch all condensate which may emanate from the unit.
- Drainage via gravity feed from this pan to a suitable connection; or booster pump assisted drainage where indicated on the relevant drawings or in the accompanying schedule.
- The drain pan to be fabricated from PVC piping.
- Drain piping to be fixed and routed to the nearest suitable drain point to ensure positive drainage.
- Drain piping to be resistant or protected against weather elements or people traffic.

4.2.2 Electrical

The electrics and controls are to have the following minimum requirements:

- All electrically powered elements within the unit to have an adequate resistance to earth, with due regard to the possible condensation of moisture and comply with statutory requirements.
- Interconnecting wiring from the outdoor unit to the indoor unit is to be via conduits or suitable special cable.
- Power supply from the local isolator is to be protected against the elements by means of conduit or suitable cable.
- Confirm adequacy of the power supply at equipment submission stage.
- Power supply cable to the isolator shall be in white PVC trunking. Whenever the original power cable of the air conditioner unit is too short; the Contractor shall remove it from inside the air conditioner unit’s terminals and replaced it with a suitable sized longer cable. Trunking shall be fixed to the wall with screws – not double-sided tape.
- Installation to comply with SANS 10147-1:2017 requirements
- No joints are allowed on any electrical wiring between the indoor and outdoor unit.
- Contractor to supply lockable and water proofed isolator for each unit. These isolators shall be mounted on the outside of the building.
- Preferred brand Carrier/Mitsubishi

4.2.3 Commissioning of the system

Commissioning is to be done in accordance with OEM requirements and commissioning reports to be issued to the Employer after completion of the project during the handover phase. Commissioning reports shall have to be submitted as part of the QCP file/ package.

4.3 ELECTRICAL SCOPE OF WORK

- The Contractor shall delivery, procure, transport, install all the required electrical components etc.
- All the wiring in the park homes must be decommissioned by the *Contractor*.
- The Contractor must verify if the DBs are still functional in the park homes, and if not they shall be decommissioned.

CONTROLLED DISCLOSURE

- It is the Contractor's responsibility to issue the CoC for the electrical installation in compliance with SANS 10142-1.
- It is the Contractor's responsibility to ensure that all the park homes wiring comply with SANS 10142-1

- Main distribution board – All circuits labelled as per SANS 10142-1
- Double pole main circuit breaker for single phase/ three poles for three phase. Breaker size/current will be determined by the loading in the building.
- The rated earth leakage tripping current (rated residual current) required to activate an earth leakage protection device shall not exceed 30mA.
- All the circuits that supply socket-outlets shall have the earth leakage protection.
- The insulation resistance test on wiring and components shall be performed as per SANS.
- The resistance of the earth continuity circuit to earth shall not exceed 0,2 ohms.

- Earth terminal connected to the supplier's earth, earth wire size depends on cable/load to park home.
- Surge protection to protect equipment against overvoltage.
- Main distribution board should be fitted with the following.
 - i. Main switch,
 - ii. earth leakage relay,
 - iii. 20x 30Amps miniature circuit breaker (MCB) for plugs,
 - iv. 26x 15Amps for lights, earth leakage,
 - v. MCB for each air conditioner.
- The following areas below should be fitted with one switch for lights and one plug for electrical appliances.
 - i. Each office,
 - ii. Boardroom,
 - iii. Kitchen,
 - iv. Passages
- 20x 30Amp MCB for plugs, 24x 10Amp MCB for lights
- Wiring to be provided from the point of supply to the point of consumption
- MCB per air conditioner, depending on rated current of the air conditioner.
- Voltage drop from main supply to the distribution board must be less than 5% of the supply voltage.
- Additional lighting required to be standardised with the lights that are currently installed on the park home.
- The quantity of the additional lights should be determined by the contractor based on the lux that is required for the area.
- The number of lights to be installed must depend on the size of the area to be occupied
- The distribution board should have a drawing with all the circuits and their designation
- All conductive water pipes earthed.

5. SAFETY REQUIREMENTS

- Contractor Safety File must be pre-approved by Duvha Safety Department.
- Contractor employees must complete Duvha Safety Induction Course, before any work can be executed.
- Risk assessment and Pre-job brief shall be conducted by Contractor Supervisor with all his employees. Copies shall be handed over to the client.
- No work shall be performed without a Permit to Work. Domestic installations are exempted.
- No work shall be performed without pre-arrangement with the project manager.

CONTROLLED DISCLOSURE

- Special care must be taken regarding people that might occupy the office while the installations are done.
- Any damage to the ceiling, walls, floors, paint work or other office equipment etc. shall be repaired by the Contractor on own cost.
- All other spares, materials and safety equipment needed to do the work, shall be supplied by the Contractor.
- All required Personal protective equipment (PPE) must be worn all the time.
- All Eskom's and other safety rules must be adhered to all the time.

6. QUALITY REQUIREMENTS

No work shall commence before the approval of the QCP. The *Contractor* is expected to compile the QCP document and submit it to the *Employer* for review and approval. The *Contractor* is also expected to thoroughly go through the standard: 240-105658000 Supplier Quality Management Specification. Find the standard attached. The following shall be submitted to the Project Manager before work commence.

- Method statements and specifications adhered to;
- Material Certificates;
- Calibration Certificates;
- Calculations for any temporary works that may be required for the safe execution of the works;
- Steel grade certificates.

7. HANDOVER

Apart from any statutory data packages required, the Contractor also compiles a data package of the relevant drawings, test certificates etc. to the Project Manager for acceptance. These include, but are not limited to:

- Document List;
- Instruction for Work/ Purchase Order;
- Approved and signed off ITP's, QCP's;
- Certificate of Compliance
- Notifications;
- Modifications;
- Concessions;
- Technical Queries, Engineering Responses and communications with Project Manager/ Employer
- Non-conformance reports;
- Internal Release Notes;
- Transport notifications;
- As-built data and marked up drawings of the completed *works* upon handover.
- Concrete 7 day and 28 day cube test results;
- Slump test results;

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- Concrete mix designs including all required test results e.g. aggregate test results;
- Pre-concrete and post concrete surveys
- Weld Map;
- Weld Matrix Sheet;
- Weld Sequence;
- Welding Consumables Certificates;
- NDT Reports/ Results;

8. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation
	System Engineer: Auxiliary Engineering (HVAC)
	System Engineer: Electrical Engineering
	Manager: Auxiliary Maintenance
	Manager: Support Services
	Manager: Training Department

9. REVISIONS

Date	Rev.	Compiler	Remarks
March 2021	A		Draft Document
April 2023	0.1		HVAC and Electrical requirements
April 2024	1		Final Document

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